



**CONESTOGA-ROVERS
& ASSOCIATES**

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August 22, 2011

Reference No. 054046

Mr. David Garrett
U.S. Environmental Protection Agency Region 7
Air and Waste Management Division
RCRA Corrective Action & Permits Branch
901 N. Fifth Street
Kansas City, Kansas 66101

VIA
FEDEX COURIER

DRWM Rec'd AUG 22 2011

Dear Mr. Garrett:

Re: Supplemental Interceptor Well, Monitoring Well, and Piezometer Installations
Occidental Chemical Corporation Facility
Wichita, Kansas

The purpose of this letter is to document the recent installation of two interceptor wells, five monitoring wells, and five piezometers on properties near the Occidental Chemical Corporation (OCC) Wichita Facility (Facility). In general, these activities were completed as follow up recommendations identified in the Interceptor Well System Interim Corrective Measures Effectiveness Evaluation Report (February 2010), the Conceptual Design Summary Groundwater ICM Modification Report (March 2011), and subsequent discussions with the U.S. EPA. Figure 1 illustrates the locations of the new interceptor wells, monitoring wells, and piezometers.

From March 14, 2011 through March 22, 2011, CRA oversaw the installation of five new monitoring wells and five new piezometers. Boart Longyear Company (Boart) provided drilling services for the monitoring well and piezometer installations.

Two new monitoring wells, MW141S2/S3 and MW142S2/S3, were installed in the area to the south of monitoring well nests MW15, MW22, and MW137S3 to provide additional groundwater quality and hydraulic monitoring data in this area.

Three new monitoring wells were installed east of the OCC Facility. Monitoring well MW143S2/S3 was installed south of the MW10 cluster. Monitoring wells MW144S2/S3 and MW145S2/S3 were installed between existing wells MW132S2/S3 and MW135S2/S3.

Monitoring well borings were advanced using rotary-sonic drilling techniques. Soil samples were collected continuously during borehole advancement, and soil samples were described in accordance with the Unified Soil Classification System (USCS). Monitoring wells were constructed of varying lengths of 2-inch diameter polyvinyl chloride (PVC) No. 10 slot screen and a sufficient length of 2-inch diameter PVC riser to extend to the surface. The borehole annulus was backfilled with Red Flint No. 40-filter sand to a minimum of 2 feet above the top of the well screen. A 2-foot bentonite pellet seal was installed on top of the filter pack and

RCRA



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August 22, 2011

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Reference No. 054046

hydrated with potable water. The remaining annular space was filled with bentonite grout. MW142S2/S3 was fitted with a flush-mount protective cover installed above the wellhead and cemented in place. All other monitoring wells were fitted with stick-up protective covers installed above the wellhead and cemented in place. Bumper posts were placed around those monitoring wells. All downhole drilling steel was decontaminated using a high-pressure, low volume steam cleaner before drilling at each subsequent borehole location.

Five new piezometers were installed to better define the groundwater flow conditions at the Facility near interceptor wells IW43 and IW44. One new piezometer, PZ43A, was installed near interceptor well IW43. Four new piezometers, PZ44A, PZ44B, PZ44C, and PZ44D, were installed near interceptor well IW44.

The five new monitoring wells and five new piezometers were screened in the S2/S3 aquifer. The monitoring wells and piezometers were developed following installation to reduce the amount of suspended sediment present. Stratigraphic and instrumentation logs for the new monitoring wells and piezometers are provided in Attachment A.

Water generated from equipment decontamination and development of the monitoring wells and piezometers was containerized and transported to the Facility and discharged into the deep well injection system.

In March 2011, two new interceptor wells, IW43 and IW44, were installed southeast of the OCC Facility in the general vicinity of MW140. The interceptor wells were screened in the S2/S3 aquifer. Clark Well and Equipment provided drilling services for interceptor well installations. Interceptor wells were installed using reverse rotary drilling techniques. Interceptor wells were constructed with 20-foot lengths of 16-inch diameter stainless steel screen and a sufficient length of 16-inch diameter steel riser to extend to the surface. The borehole annulus was backfilled with Quickrete No. 4 filter sand to a minimum of 5 feet above the top of the well screen. A 5-foot bentonite pellet seal was installed on top of the filter pack and hydrated with potable water. The remaining annular space was filled with cement bentonite grout. Water generated from the construction and development of the two new interceptor wells was disposed off Site by Clean Harbors, Inc.

Stratigraphic and instrumentation logs for the new interceptor wells are provided in Attachment A.

Each of the newly installed interceptor wells, groundwater monitoring wells, and piezometers was surveyed for horizontal and vertical control by Garber Surveying Service, P.A. of Hutchinson, Kansas.



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& ASSOCIATES

August 22, 2011

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Please don't hesitate to contact me or Juan Somoano if you have questions or need further information.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Bruce Clegg

BCC/lg/49
Encl.

c.c.: Everett Spellman - KDHE
Juan Somoano - GSHI
Lisa Blair - OCC

ATTACHMENT A

STRATIGRAPHIC AND INSTRUMENTATION LOGS

CLARKE WELL & EQUIPMENT, INC.
WELL RECORD

JOB NUMBER 10667

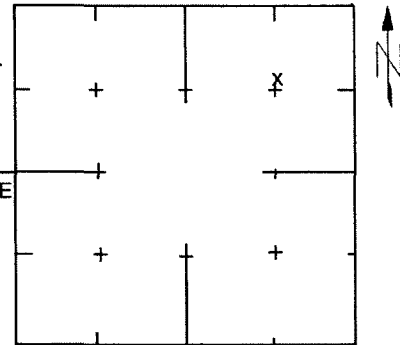
WELL OWNER Occidental Chemical Corporation WELL NO. IW-43

WELL USE Remediation APPR. NO. 2019127

LEGAL SW 1/4 NE 1/4 NE 1/4 Sect 34 Twp 28 S Rng 01 W Sedgwick KS

 FSL, FEL

GPS - 640297 E 4159659 N Zone 14 NAD 27



Formation Log

SIZE HOLE 24 " DIA. Electric Log ☐ SWL 46' SECTION 34

[illegible]

(Well Construction on Other Side)

DRILLED BY Mark Esfeld & Jared Brown

DATE 3/23/11

WELL CONSTRUCTIONJOB # 10667 WELL OWNER Occidental Chemical Corporation WELL NO. IW-43HOLE DIA. 24 " TD 82.5 ☐ REAMED OUT FROM _____ " DIA. HOLE DRILLING METHOD Reverse RotarySIZE CASING 16 " DIA. .500 WALL; WT. 82.85 LBS/FT Steel MATERIALSIZE SCREEN 16 " DIA. _____ WALL; Stainless Steel MATERIALSCREEN TYPE Continuous Wire Wrap**CASING AND SCREEN****GRAVEL PACK / ANNULAR SEAL**

DESCRIPTION	FROM	TO	FEET	OPENING
Steel Casing	0	62	62	
SS Screen	62	82	20	.070
24" ss casing 30" above ground and 30" in ground				
installed around 16" casing				
Casing left above ground			1.15	
Total Casing and Screen			83.15	

MATERIAL	FROM	TO	FEET	QTY
Compacted Soil	0	1	1	
Concrete Grout (5% Bentonite)	1	52	51	
Bentonite Chips	52	57	5	15 sks
Quikrete #4 sand	57	82.5	25.5	3 Ton

Water Samples

FROM	TO	Cl (ppm)	OTHER TESTS

Development

Method	Hours
Air	1.5

Disinfected with None Quantity What is the nearest source of possible contamination? OxyChem Plant ContaminationDirection from well Northwest How many feet 2000Water level measurement tube installed? ☐ Yes ☒ No Locking cap installed? ☒ Yes ☐ No

NOTE: All measurements are from ground level

DESIGNED BY

CLARKE WELL & EQUIPMENT, INC.
WELL RECORD

JOB NUMBER 10667

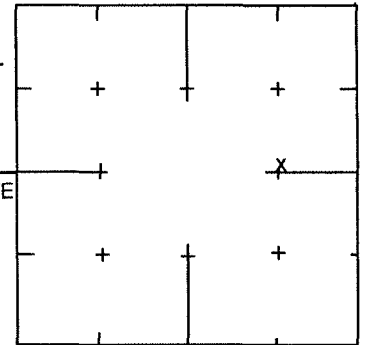
WELL OWNER Occidental Chemical Corporation WELL NO. IW-44

WELL USE Remediation APPR. NO. Term Permit 2019128

LEGAL SW 1/4 SE 1/4 NE 1/4 Sect 34 Twp 28 S Rng 01 W Sedgwick KS

 FSL, FEL

GPS - 640328 E 4159237 N Zone 14 NAD 27



Formation Log

SIZE HOLE 24 " DIA.

Electric Log ☐

SWL 44.5' BGL

SECTION 34[illegible]

(Well Construction on Other Side)

DRILLED BY Mark Esfeld & Jared Brown

DATE 3/30/2011

WELL CONSTRUCTIONJOB # 10667 WELL OWNER Occidental Chemical Corporation WELL NO. Iw-44HOLE DIA. 24 " TD 80' ☐ REAMED OUT FROM _____ " DIA. HOLE DRILLING METHOD _____SIZE CASING 16 " DIA. .500" WALL; WT. 82.85 LBS/FT Steel MATERIALSIZE SCREEN 16 " DIA. _____ WALL; Stainless Steel MATERIALSCREEN TYPE Continuous Wire Wrap**CASING AND SCREEN**

DESCRIPTION	FROM	TO	FEET	OPENING
16" Steel Casing	0	59	59	
16" Stainless Steel Screen	59	79	20	.070
24" ss casing 30" above				
ground and 30" in ground				
installed around 16" casing				
Casing left above ground			1	
Total Casing and Screen			80	

GRAVEL PACK / ANNULAR SEAL

MATERIAL	FROM	TO	FEET	QTY
Concrete Grout (5% Bentonite)	0	49	49	3.2 Yd
Bentonite Hole Plug	49	54	5	15 sks
Quikrete #4 Sand	54	80	26	3 Tons

Water Samples

FROM	TO	Cl (ppm)	OTHER TESTS

Development

Method	Hours
Air	1.5 Hrs

Disinfected with None Quantity What is the nearest source of possible contamination? OxyChem Plant ContaminationDirection from well Northwest How many feet ~2500'Water level measurement tube installed? ☐ Yes ☒ No Locking cap installed? ☒ Yes ☐ No

NOTE: All measurements are from ground level

DESIGNED BY



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear


HOLE DESIGNATION: MW141S2/S3

DATE COMPLETED: March 18, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1307 86 1305 37						
5	CL CLAY, trace silt, medium plasticity, dark brown		Concrete					
10								
15	ML SILT, gray	1290 37						
	SM SAND, some silt, fine grained, gray/brown	1288 37						
20	SW SAND, fine to coarse grained, brown	1285 87						
25			Bentonite Grout					
30								
35								
40	CL CLAY, medium plasticity, dark brown	1268 37						
45	ML SILT, some fine grained sand, brown	1260 37						
	SP SAND, fine grained, brown	1258 37						
50	SW SAND, trace gravel, red and brown	1255 37						
	SP SAND, fine grained, brown	1251 37						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

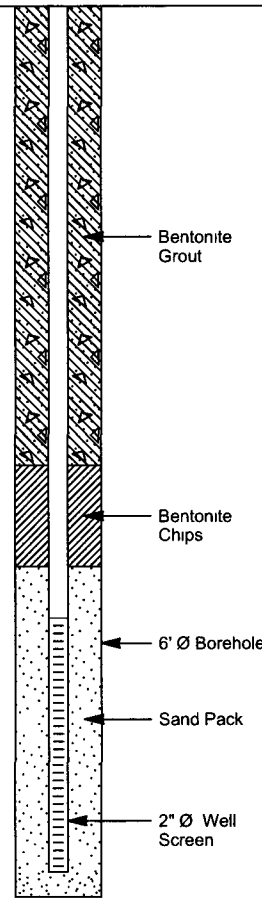
HOLE DESIGNATION: MW141S2/S3

DATE COMPLETED: March 18, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
60	SW SAND, trace gravel, red and brown	1244.37						
65	SP SAND, fine grained, brown	1241.37						
70	- fine to medium grained at 73.0ft BGS							
75								
80								
85								
90	CL CLAY, trace silt, medium plasticity, brown	1217.37						
90	END OF BOREHOLE @ 90.0ft BGS	1215.37						
95								
100								
105								

WELL DETAILS

Screened interval

1226.37 to 1216.37ft AMSL

79.00 to 89.00ft BGS

Length 10ft

Diameter 2in

Slot Size 0.010

Material PVC

Seal

1232.37 to 1228.37ft AMSL

73.00 to 77.00ft BGS

Material Bentonite Chips

Sand Pack

1228.37 to 1215.37ft AMSL

77.00 to 90.00ft BGS

Material Red Flint #40 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

HOLE DESIGNATION: MW142S2/S3

DATE COMPLETED: March 20, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	GROUND SURFACE TOP OF CASING	1297.38 1297.03						
5	CL CLAY, trace silt, low plasticity, dark brown		Concrete					
10								
15	SW SAND, trace gravel, fine to coarse grained sand, brown	1282.38						
20								
25	- yellow/red from 22.0 to 25.0 ft BGS							
27	ML SILT, brown	1271.38	Bentonite Grout					
28	SP SAND, fine grained, brown	1270.88						
30	SW SAND, trace gravel, fine to coarse grained sand, red/yellow	1267.38						
35								
37	CL CLAY, trace sand, brown	1261.38						
39	ML SILT, brown	1258.88						
40	SP SAND, trace silt, fine grained, brown	1257.38						
45								
50	SW SAND, fine to coarse grained, brown red	1247.38						
52	CL CLAY, low plasticity, gray	1245.38						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

HOLE DESIGNATION: MW142S2/S3

DATE COMPLETED: March 20, 2011

DRILLING METHOD: Rotasonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
60								
65	ML SILT, mottled gray/brown	1231.38	Bentonite Grout					
70			Bentonite Chips					
75	SP SAND, fine grained, brown	1225.38	6" Ø Borehole					
80			Sand Pack					
85	ML SILT, mottled gray/brown	1215.38	2" Ø Well Screen					
85	CL CLAY, gray/brown	1213.38						
90	END OF BOREHOLE @ 90.0ft BGS	1207.38	Bentonite Chips					
95								
100								
105								

WELL DETAILS

Screened interval:
1225.38 to 1215.38ft AMSL
72.00 to 82.00ft BGS

Length 10ft

Diameter 2in

Slot Size 0.010

Material PVC

Seal

1229.88 to 1227.38ft AMSL
67.50 to 70.00ft BGS

Material Bentonite Chips

Sand Pack

1227.38 to 1212.38ft AMSL
70.00 to 85.00ft BGS

Material Red Flint #40 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear




HOLE DESIGNATION: MW143S2/S3

DATE COMPLETED: March 20, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1300.32 1298.25						
2	CL CLAY, trace silt, low plasticity, dark brown		 Concrete					
4								
6	- trace sand, iron staining, red from 5.0 to 6.0 ft BGS							
8								
10								
12		1286.25						
14	SW SAND, fine to coarse grained, brown/red							
16								
18								
20								
22								
24		1273.25						
26	SP SAND, fine grained, brown		 Bentonite Grout					
28								
30								
32								
34								
36	ML SILT, brown	1263.25						
38	CL CLAY, trace silt and sand, medium plasticity, brown	1261.75						
40	SP SAND, fine grained, brown	1258.25						
42								
44								
46								
48								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP.GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

HOLE DESIGNATION: MW143S2/S3

DATE COMPLETED: March 20, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52								
54								
56	ML SILT, brown	1243.25						
58								
60	CL CLAY, sandy, gray	1239.25						
62								
64	SW SAND, fine to coarse grained, red/yellow	1233.75						
66								
68	CL CLAY, low plasticity, brown	1231.25						
70								
72	- gray at 71.0ft BGS							
74								
76	END OF BOREHOLE @ 75.0ft BGS	1223.25						
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								

WELL DETAILS

Screened interval:

1235.25 to 1230.25ft AMSL

63.00 to 68.00ft BGS

Length 5ft

Diameter 2in

Slot Size 0.010

Material PVC

Seal:

1241.25 to 1237.25ft AMSL

57.00 to 61.00ft BGS

Material Bentonite Chips

Sand Pack

1237.25 to 1228.25ft AMSL

61.00 to 70.00ft BGS

Material Red Flint #40 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear



HOLE DESIGNATION: MW144S2/S3

DATE COMPLETED: March 22, 2011

DRILLING METHOD: Rotasonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1303.64 1301.31						
2	CL CLAY, trace silt, low plasticity, dark brown		 Concrete					
4								
6								
8								
10	- iron staining, red from 9.5 to 10.0ft BGS							
12	- sandy at 12.0ft BGS							
14								
16	SP SAND, fine to medium grained, brown red	1286.81						
18								
20								
22	- fine grained, light brown at 22.0ft BGS							
24								
26								
28								
30	SW SAND, fine to coarse grained, red brown	1271.31						
32								
34								
36								
38								
40								
42	SP SAND, fine to medium grained, light brown	1259.31						
44								
46								
48								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP.GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: OCC Wichita

HOLE DESIGNATION: MW144S2/S3

PROJECT NUMBER: 054046

DATE COMPLETED: March 22, 2011

CLIENT: GSH

DRILLING METHOD: Rotosonic

LOCATION: Wichita, Kansas

FIELD PERSONNEL: J. Hargens

DRILLING CONTRACTOR: Boart Longyear

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52	SW SAND, fine to coarse grained	1251.31	<p>WELL DETAILS Screened interval: 1254.31 to 1244.31ft AMSL 47.00 to 57.00ft BGS Length 10ft Diameter 2in Slot Size 0.010 Material PVC Seal 1259.31 to 1256.31ft AMSL 42.00 to 45.00ft BGS Material Bentonite Chips Sand Pack 1256.31 to 1242.31ft AMSL 45.00 to 59.00ft BGS Material Red Flint #40 Sand</p>					
54	SP SAND, fine to medium grained, light brown	1248.31						
56	SW SAND, fine to coarse grained	1246.31						
58	CL CLAY, low plasticity, brown	1244.31						
60	CL/ML CLAY, silty, medium plasticity, brown	1241.31						
62								
64								
66	END OF BOREHOLE @ 65.0ft BGS	1236.31						
68								
70								
72								
74								
76								
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear



HOLE DESIGNATION: MW145S2/S3

DATE COMPLETED: March 21, 2011

DRILLING METHOD: Rotasonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	MONITOR WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	N' VALUE
	TOP OF CASING GROUND SURFACE	1291.12 1289.08					
2	CL CLAY, trace silt, low plasticity, dark brown						
4							
6							
8	SP SAND, fine to medium grained, brown	1281.08					
10	SW SAND, fine to coarse grained, brown/red	1279.08					
12							
14							
16							
18							
20							
22							
24	SP SAND, trace silt, fine grained, brown	1266.08					
26							
28							
30							
32							
34							
36	SW SAND, fine to coarse grained, red/brown	1253.08					
38							
40	SP SAND, trace fine grained gravel, coarse grained sand, red/brown	1249.08					
42							
44	CH CLAY, high plasticity, brown	1245.08					
46	SP SAND, fine grained, light brown	1242.58					
48							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

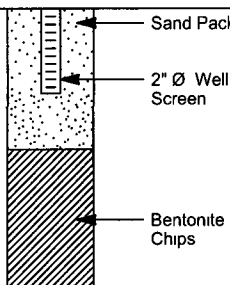

HOLE DESIGNATION: MW145S2/S3

DATE COMPLETED: March 21, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	MONITOR WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52	CL CLAY, trace silt, low plasticity, brown	1236 08	 <p>Sand Pack 2" Ø Well Screen Bentonite Chips</p>					
54								
56								
58	END OF BOREHOLE @ 60.0ft BGS	1229 08						
60								
62			<p><u>WELL DETAILS</u> Screened interval 1241 08 to 1236 08ft AMSL 48 00 to 53 00ft BGS Length 5ft Diameter 2in Slot Size 0 010 Material PVC Seal 1246 08 to 1243.08ft AMSL 43.00 to 46 00ft BGS Material Bentonite Chips Sand Pack: 1241 08 to 1234 08ft AMSL 48 00 to 55 00ft BGS Material Red Flint #40 Sand</p>					
64								
66								
68								
70								
72								
74								
76								
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

HOLE DESIGNATION: PZ43A

DATE COMPLETED: March 15, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1306 00 1302.50						
2	CL CLAY, silty, hard, dark gray							
4								
6								
8								
10	- some fine grained sand at 10.0ft BGS							
12								
14								
16								
18	SP SAND, fine grained, yellow	1284 50						
20	- fine to medium grained at 21.0ft BGS							
22								
24								
26								
28	SW SAND, fine to coarse grained, yellow	1274 50						
30								
32								
34								
36	SC SAND, trace clay nodules, fine to medium grained, yellow	1267 50						
38								
40	SP SAND, fine grained, brown, wet	1262 50						
42								
44								
46								
48								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP.GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

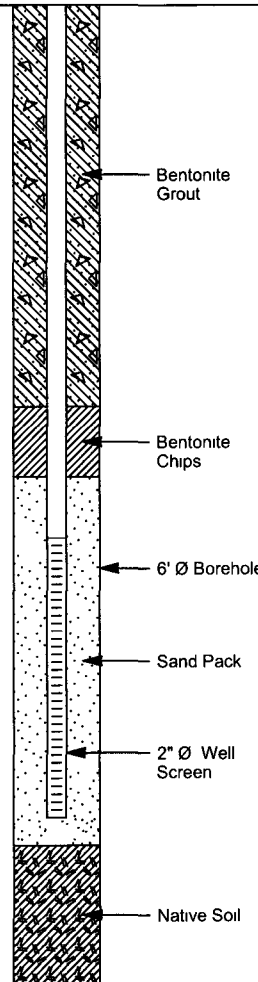
HOLE DESIGNATION: PZ43A

DATE COMPLETED: March 15, 2011

DRILLING METHOD: Rotasonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52	SW SAND, fine to coarse grained, red and yellow	1250.50						
54								
56								
58								
60								
62	SP SAND, fine to medium grained	1235.50						
64								
66								
68								
70								
72								
74								
76								
78								
80								
82	CL CLAY, hard, brown	1219.50						
84								
86	END OF BOREHOLE @ 85.0ft BGS	1217.50						
88				<u>WELL DETAILS</u>				
90				Screened interval				
92				1233.50 to 1223.50ft AMSL				
94				69.00 to 79.00ft BGS				
96				Length 10ft				
98				Diameter 2in				
				Slot Size. 0.010				
				Material PVC				
				Seal				
				1238.20 to 1235.70ft AMSL				
			64.30 to 66.80ft BGS					
			Material Bentonite Chips					
			Sand Pack					
			1235.70 to 1222.50ft AMSL					
			66.80 to 80.00ft BGS					
			Material. Red Flint #40 Sand					

WELL DETAILS

Screened interval
1233.50 to 1223.50ft AMSL
69.00 to 79.00ft BGS

Length 10ft
Diameter 2in
Slot Size 0.010
Material PVC
Seal

1238.20 to 1235.70ft AMSL
64.30 to 66.80ft BGS
Material Bentonite Chips
Sand Pack

1235.70 to 1222.50ft AMSL
66.80 to 80.00ft BGS
Material Red Flint #40 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI.GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

HOLE DESIGNATION: PZ44A

DATE COMPLETED: March 15, 2011

DRILLING METHOD: Rotosonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1303.57 1301.30						
2	CL CLAY, hard, dark brown							
4								
6								
8								
10								
12								
14								
16								
18								
20	SP SAND, medium to coarse grained, yellow	1282.30						
22								
24								
26								
28	ML SILT, soft, brown	1273.30						
30	CL CLAY, medium plasticity, brown	1271.30						
32								
34								
36								
38								
40								
42								
44								
46	SP SAND, fine grained, brown	1256.30						
48	CL/ML CLAY, silty, soft, brown	1254.30						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA_CORP.GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: OCC Wichita

HOLE DESIGNATION: PZ44A

PROJECT NUMBER: 054046

DATE COMPLETED: March 15, 2011

CLIENT: GSH

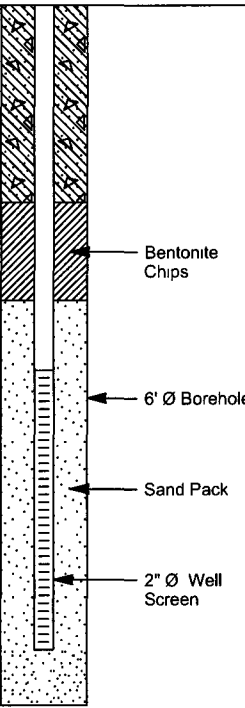
DRILLING METHOD: Rotasonic

LOCATION: Wichita, Kansas

FIELD PERSONNEL: J. Hargens

DRILLING CONTRACTOR: Boart Longyear

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52	SP SAND, fine grained, brown, wet	1251.30						
54								
56	SW SAND, fine to coarse grained	1246.30						
58	SP SAND, fine grained, brown, wet	1244.30						
60	SW SAND, fine to coarse grained	1241.30						
62	SP SAND, fine grained, brown, wet	1239.30						
64								
66	SW SAND, fine to coarse grained, yellow/red	1236.30						
68								
70								
72								
74								
76	END OF BOREHOLE @ 75.0ft BGS	1226.30						
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								

WELL DETAILS

Screened interval

1238.30 to 1228.30ft AMSL

63.00 to 73.00ft BGS

Length 10ft

Diameter 2in

Slot Size 0.010

Material PVC

Seal

1244.30 to 1240.80ft AMSL

57.00 to 60.50ft BGS

Material Bentonite Chips

Sand Pack

1240.80 to 1226.30ft AMSL

60.50 to 75.00ft BGS

Material Red Flint #40 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

HOLE DESIGNATION: PZ44B

PROJECT NUMBER: 054046

DATE COMPLETED: March 18, 2011

CLIENT: GSH

DRILLING METHOD: Rotosonic

LOCATION: Wichita, Kansas

FIELD PERSONNEL: J. Hargens

DRILLING CONTRACTOR: Boart Longyear

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1303.93 1301.50						
	For stratigraphy, see PZ44A							
2								
4								
6								
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								
30								
32								
34								
36								
38								
40								
42								
44								
46								
48								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA_CORP GDT 7/15/11

Bentonite
Grout



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

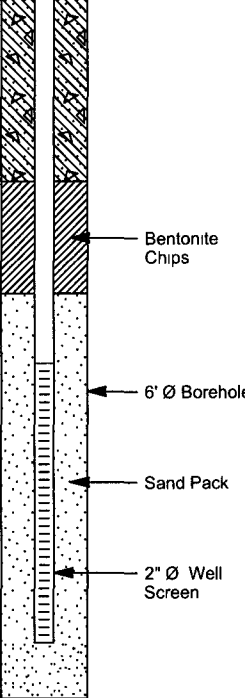
HOLE DESIGNATION: PZ44B

DATE COMPLETED: March 18, 2011

DRILLING METHOD: Rotasonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52								
54								
56								
58								
60								
62								
64								
66								
68								
70								
72								
74								
76	END OF BOREHOLE @ 75.0ft BGS	1226 50	 <p>Bentonite Chips</p> <p>6" Ø Borehole</p> <p>Sand Pack</p> <p>2" Ø Well Screen</p>					
78			<u>WELL DETAILS</u> Screened Interval 1238 50 to 1228 50ft AMSL 63 00 to 73 00ft BGS Length: 10ft Diameter: 2in Slot Size: 0 010 Material: PVC Seal 1245 00 to 1241 00ft AMSL 56 50 to 60 50ft BGS Material: Bentonite Chips Sand Pack 1241 00 to 1226 50ft AMSL 60 50 to 75 00ft BGS Material: Red Flint #40 Sand					
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP.GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

HOLE DESIGNATION: PZ44C

PROJECT NUMBER: 054046

DATE COMPLETED: March 17, 2011

CLIENT: GSH

DRILLING METHOD: Rotosonic

LOCATION: Wichita, Kansas

FIELD PERSONNEL: J. Hargens

DRILLING CONTRACTOR: Boart Longyear

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1303.75 1301.60						
	For stratigraphy, see PZ44A							
2								
4								
6								
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								
30								
32								
34								
36								
38								
40								
42								
44								
46								
48								

OVERBURDEN LOG 54046 CHI GPJ CRA_CORP.GDT 7/15/11

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

HOLE DESIGNATION: PZ44C

DATE COMPLETED: March 17, 2011

DRILLING METHOD: Rotasonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52								
54								
56								
58								
60								
62								
64								
66								
68								
70								
72								
74								
76	END OF BOREHOLE @ 75.0ft BGS	1226 60						
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: OCC Wichita

HOLE DESIGNATION: PZ44D

PROJECT NUMBER: 054046

DATE COMPLETED: March 17, 2011

CLIENT: GSH

DRILLING METHOD: Rotosonic

LOCATION: Wichita, Kansas

FIELD PERSONNEL: J. Hargens

DRILLING CONTRACTOR: Boart Longyear

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	TOP OF CASING GROUND SURFACE	1303.38 1301.40						
	For stratigraphy, see PZ44A							
2								
4								
6								
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								
30								
32								
34								
36								
38								
40								
42								
44								
46								
48								

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: OCC Wichita

PROJECT NUMBER: 054046

CLIENT: GSH

LOCATION: Wichita, Kansas

DRILLING CONTRACTOR: Boart Longyear

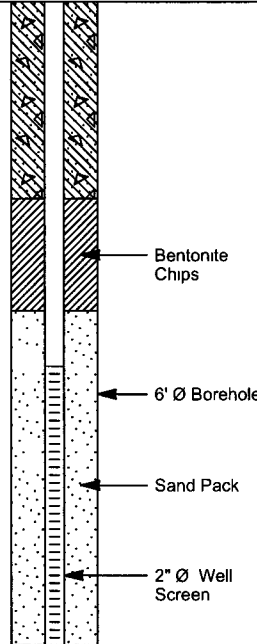
HOLE DESIGNATION: PZ44D

DATE COMPLETED: March 17, 2011

DRILLING METHOD: Rotasonic

FIELD PERSONNEL: J. Hargens

DRILLER: R. Radke

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	PIEZOMETER	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
52								
54								
56								
58								
60								
62								
64								
66								
68								
70								
72								
74	END OF BOREHOLE @ 73.0ft BGS	1228.40						
76			WELL DETAILS Screened Interval 1238.40 to 1228.40ft AMSL 63.00 to 73.00ft BGS Length: 10ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 1244.40 to 1240.40ft AMSL 57.00 to 61.00ft BGS Material: Bentonite Chips Sand Pack 1240.40 to 1228.40ft AMSL 61.00 to 73.00ft BGS Material: Red Flint #40 Sand					
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 54046 CHI GPJ CRA CORP GDT 7/15/11